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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,865	07/20/2004	Takuo Hino	10873.1487USWO	6390
53148	7590	09/08/2005	EXAMINER	
HAMRE, SCHUMANN, MUELLER & LARSON P.C.			GEBREMARIAM, SAMUEL A	
P.O. BOX 2902			ART UNIT	
MINNEAPOLIS, MN 55402			PAPER NUMBER	
			2811	

DATE MAILED: 09/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/501,865	Applicant(s) HINO ET AL.	
	Examiner Samuel A. Gebremariam	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8-10 and 14 is/are allowed.
- 6) ☒ Claim(s) 1-7 and 11-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Liu et al. US patent No. 6,198,153.

Regarding claim 1, Liu teaches a MIM (metal-insulator-metal) capacitor (fig. 3) comprising: a substrate (34); a first metal area (30); a second metal area (28) formed between the substrate (34) and the first metal area (30); and a first insulating layer (insulating layer exists between 30 and 28 to form a capacitor) formed between the first metal area (30) and the second metal area (28); wherein a capacitance value is determined by opposing surface areas of the first metal area and the second metal area (inherent property of a capacitor); and further comprising: a third metal area (26) formed between the second metal area (28) and the substrate (34); a second insulating layer formed between the third metal area (26) and the second metal area (28); a third insulating layer formed between the third metal area (26) and the substrate (34), the third insulating layer being in direct contact with the third metal area and the substrate (there has to be an insulating layer between 26 and 34 and it is in direct contact with

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both the substrate and the third metal area); wherein the third metal area is connected to a ground potential (refer to fig. 3).

3. Claim 11 is rejected under 35 U.S.C. 102(b) as being anticipated by Lee et al. US patent No. 6,235,573.

4. Regarding claim 11, Liu teaches (fig. 5) a MIM capacitor comprising: a substrate (51); a first metal area (67a on the left hand side) formed opposing the substrate (51); and a second metal area (67a on the right hand side) formed opposing the substrate (51), the second metal area being coplanar with the first metal area (67a on the left and the right hand side are coplanar); a third metal area (63a) formed between the first and second metal areas (67a) and the substrate (51) so as to oppose both the first metal area and the second metal area; wherein a first capacitance value is determined by opposing surface areas of the first metal area and the third metal area, and a second capacitance value is determined by opposing surface areas of the second metal area and the third metal area; and wherein the third metal area is formed so as to be in an electrically floating state (layer 63a is not connect to any point).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2-7 AND 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu in view of Roy US patent No. (6,387,770).

Regarding claim 2, Liu teaches substantially the entire claimed structure of claim 1 above except explicitly stating that a surface area of a surface of the third metal area opposing the second metal area is smaller than a surface area of a surface of the second metal area.

Roy teaches (fig. 10) a capacitor structure (200) with upper and lower electrodes (202) and ((204) respectively where the surface area of the lower electrode is smaller than the upper electrode.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust size of the second and third metal area of Liu's structure as taught by Roy in order to protect the third metal from damage during subsequent device fabrication steps.

Regarding claim 3, Liu teaches substantially the entire claimed structure of claims 1 and 2 above including a metal-free area (refer to the gap 214 and 216 of Roy fig. 10) formed in the third metal area is formed by a plurality of metal-free areas.

Regarding claim 4, Liu teaches substantially the entire claimed structure of claims 1 and 2 above including the plurality of metal-free areas are formed in parallel (refer to fig. 10, Roy).

Regarding claim 5, Liu teaches substantially the entire claimed structure of claims 1 and 2 above including the plurality of metal-free areas are formed intersecting

(metal free areas 214 and 216 intersect regions 208 when viewed from the top, refer to fig. 10 Roy).

Regarding claim 6, Liu teaches substantially the entire claimed structure of claims 1 and 2 above including the plurality of metal-free areas are formed so as to be partitioned symmetrically to the third metal area (214 appears to be partitioned symmetrically to the third metal area (refer to fig. 10 of Roy).

Regarding claim 7, Liu teaches substantially the entire claimed structure of claim 1 above including third area formed as a diffusion layer having conductivity (since layer 26 is formed of polysilicon that later silicided, originally it can be considered a diffused region).

Regarding claim 15, Liu teaches substantially the entire claimed structure of claims 1 and 2 above including a surface area of a surface of the third metal area opposing the second metal area is smaller than a surface area of a surface of the second metal area, thereby providing means to adjust a Q value of a parasitic capacitor formed therebetween and wherein the third metal area shields the second metal area from the substrate (refer to the abstract of Liu).

Since the combined structure of Liu and Roy is the same as the claimed invention, the combined structure of Liu and Roy teaches providing means to adjust a Q value of a parasitic capacitor formed between the layers.

7. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. US patent No. 6,235,573 in view of Liu.

Regarding claim 12, Lee teaches substantially the entire claimed structure of claim 11 above except explicitly stating that the third metal area is connected to a ground potential.

Liu teaches (fig. 3) a MIM capacitor structure where a metal region (26) is connected a ground potential.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the ground connection taught by Liu in the structure of Lee in order to reduce noise coupling (col. 2, lines 11-15).

Regarding claim 13, Lee teaches substantially the entire claimed structure of claim 11 above except explicitly stating that the third metal area is connected to the ground potential at a connection point such that impedance to the first metal area and impedance to the second metal area are substantially equivalent.

Parameters such as impedance in the art of semiconductor manufacturing are subject to routine experimentation and optimization to achieve the desired device characteristics during fabrication.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the impedance of the first metal area and impedance of the second metal area as claimed in the structure of Lee in order to apply the device that requires impedance matching.

Allowance

8. Claims 8-10 and 14 are allowed.

Response to Arguments

9. Applicant's arguments with respect to claims 1-7 and 11-13 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel A. Gebremariam whose telephone number is (571) 272-1653. The examiner can normally be reached on 8:00am-4:30pm.

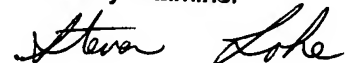
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve Loke can be reached on (571) 272-1657. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAG
September 1, 2005

Steven Loke
Primary Examiner

A handwritten signature in cursive script, appearing to read "Steven Loke", written in black ink.